

Trochosa sepulchralis, a senior synonym of *Trochosa acoma*, and the restoration of *Trochosa abdita* (Araneae, Lycosidae)

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Abstract. *Trochosa sepulchralis* (Montgomery 1902) is recognized as the senior synonym of *Trochosa acoma* (Chamberlin 1924) based upon careful examination of critical morphological characteristics. In addition, *Trochosa abdita* (Gertsch 1934), once considered a junior synonym of *T. acoma*, is now recognized as a valid species. *Trochosa sepulchralis* and *T. abdita* are fully illustrated and described, and essential information regarding species identification, morphological dimensions, and geographic distribution is included.

Keywords: Wolf spiders, Florida spiders, Texas spiders, synonymy

Spiders of the lycosid genus *Trochosa* are small to medium sized wolf spiders (5.8–13.0 mm) that are largely Holarctic in distribution. They are often found at the edge of woods and in woodland habitats. In this paper, we clarify the relationship of two Nearctic species in this genus: *Trochosa sepulchralis* (Montgomery 1902) and *T. abdita* (Gertsch 1934). Previously *T. sepulchralis* and *T. acoma* (Chamberlin 1924) were recognized as separate species (Platnick 2007), but are in fact one with *T. sepulchralis* as the senior synonym. Roewer (1955) placed *T. sepulchralis* in *Geolycosa*, despite the fact that it lacks characteristic features of this genus, such as a very high cephalothorax, darkened forelegs, and obligate burrowing behavior. *Trochosa abdita* was considered a junior synonym of *T. acoma* by Wallace (1947), but it is a distinct species. Both species have genitalic and morphological characters consistent with those of *Trochosa*.

Lycosa sepulchralis was first described by Montgomery (1902) from Philadelphia, Pennsylvania and has received little attention since that time. When *Lycosa acoma* was described by Chamberlin (1924) from a single female individual collected from New Orleans, he apparently was unaware of the great similarities between these two populations. As a result, they have been recognized as two separate species up to this point. This research began as an investigation into the relationship between *T. abdita* and *T. acoma*. We discovered drawings by Brady during the 1970's of the *L. sepulchralis* holotype that bore a striking similarity to *T. acoma*. The holotypes were then compared and it was concluded that they represent the same species, and hence the new synonymy.

Gertsch (1934) described *L. abdita* based upon a single female specimen. For reasons that were not made clear, Wallace (1947) synonymized it with *L. acoma*. The two species were grouped together and locality records for these two species from Florida, Texas, and Georgia were consolidated. Barnes (1953) did not recognize Wallace's synonymy when he included *T. abdita* in a list of spiders from North Carolina, nor did Roewer (1955). *Trochosa abdita* and *T. acoma*, both originally described in *Lycosa*, were not included in Brady's revision of the genus *Trochosa* (Brady

1979), but their placement in this group is now considered valid.

A thorough examination of the holotypes and many additional specimens of both species collected during the past 50 years have allowed us to clarify the distribution of and relationship between *T. abdita* and *T. sepulchralis*. Differences in size, geographic distribution, and the morphology of somatic and reproductive structures in these two species became readily apparent, and the existence of two distinct species is now recognized.

Trochosa abdita occurs in peninsular Florida and north along the eastern seaboard to North Carolina, while *T. sepulchralis* is found from the Florida panhandle east throughout Texas. Specimens from Pennsylvania and New York extend the range of the latter species into New England (Fig. 21).

Little is known of the natural history of these two species other than that inferred through collection methods and locations, and the scant information found with the original descriptions. Wallace (1947) reported *T. abdita* collected from "leaf mould of mesophytic hammocks in northcentral Florida." He also noted that *T. abdita* "is usually found close to its retreat which is most often a shallow burrow in the ground beneath the leaf mould." Whether or not *T. sepulchralis* shares these specific behavioral characteristics needs to be ascertained. It is hoped that this paper will stimulate further investigations of these interesting woodland wolf spiders.

METHODS

Specimens from the collections of the American Museum of Natural History, New York (AMNH); the Museum of Comparative Zoology, Cambridge, Massachusetts (MCZ); the Florida State Collection of Arthropods, Gainesville (FSCA); and Hope College, Holland, Michigan (HCC) were utilized in this study. For localities indicated by county only, we used the geographic coordinates of the county seat. Descriptions are based on multiple specimens preserved in 70–75% ethyl alcohol. Internal female genitalia were prepared by submersion in clove oil at room temperature overnight, and were drawn in the same medium. Expanded male genitalia were prepared in submersion in 10% potassium hydroxide at room temperature overnight, followed by a brief submersion

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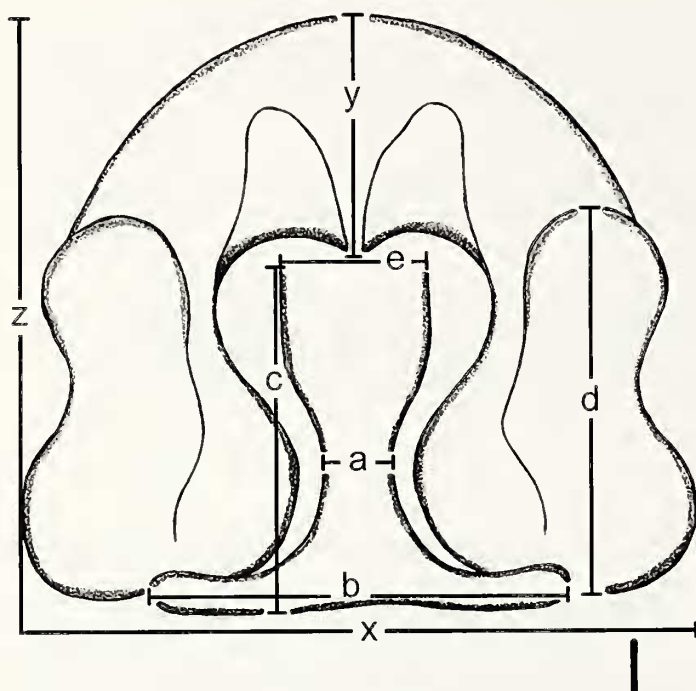


Figure 1.—Diagnostic measurements of the epigynum in *Trochosa*.

in 1% hydrochloric acid before being drawn in 75% ethyl alcohol. All other drawings were made in 75% ethyl alcohol. Drawings of male and female external genitalia omit setae for simplification.

Measurements were made following the protocol as described by Brady (1979). In each case, an optical grid was used to take each measurement at the optimum magnification, this being defined as the greatest magnification that allowed the entire structure to be seen within the field of view. A conversion factor for the optical grid under each magnification allowed the measurements to be converted into millimeters. All reported figures are in millimeters and are shown to no more than two significant figures, the greatest number possible based upon the use of the grid. The measurements are also reported here in tables as a mean \pm standard deviation and maximum to minimum values indicating the variability among species. The specimens measured were chosen on the basis of the proximity of their locality to that of the type specimen. The measurement of the Posterior Ocular Quadrangle (POQ) follows that of Brady (1962), while that of the dimensions of the epigynum and its associated structures follows a modified version to the one described by Locket & Millidge (1951). The dimensions of the epigynum as defined here are outlined below in Fig. 1, while the structures of the female epigynum and male palp are identified in Figs. 11–15. The palpal macrosetae are those on the most distal tip of the palp, and specifically identify those that are more pronounced than the fine hairs which cover this structure.

Abbreviations.—Body: anterior eye row (AER), anterior median eyes (AME), posterior eye row (PER), posterior median eyes (PME), posterior median eye width (PMEW), posterior lateral eyes (PLE), posterior lateral eye width (PLEW), Posterior Ocular Quadrangle (POQ), carapace width at the posterior lateral eyes (CWPLE), anterior cheliceral teeth

(Ant. CT), posterior cheliceral teeth (Post. CT), patella-tibia (PT), metatarsus (Meta). Measurements: carapace width (CW), carapace width at posterior lateral eyes (CWPL), carapace length (CL), length overall (LOA).

Male palpal structures: basal haematodocha (BH), conductor (CON), cymbium (CYM), distal haematodocha (DH), embolus (EMB), lunar plate of the subtegulum (LPS), median apophysis (MA), palea region (PR), tegulum (TEG), terminal apophysis (TA). Female epigynum structures: fertilization ducts (FD), middle field (MF), transverse piece (TP), spermathecae (SP), vulval chambers (VC).

TAXONOMY

Family Lycosidae Sundevall 1833

Genus *Trochosa* C.L. Koch 1847

Trochosa C.L. Koch 1848:95; C.L. Koch 1851:33; Keyserling 1877:610; Scudder 1882:328; Marx 1890:564; McCook 1894:90, 100, 107, 112, 118; Montgomery 1904:300; Banks 1905:319; Petrunkevitch 1928:250.

Trochosa (*Trochosina*) Simon 1885:10.

Trochosa (*Varacosa*) Chamberlin and Ivie 1942:36; Roewer 1955:304.

Allohogna Roewer 1955:212 (in part).

Trochosina Simon: Roewer 1955:302.

Trochosomma Roewer 1955:304.

Varacosa Chamberlin & Ivie: Roewer 1955:304.

Type species.—*Trochosa*: *Arenea ruricola* DeGeer 1778, by original designation.

Trochosa (*Trochosina*): *Trochosa terricola* Thorell 1856, by original designation.

Trochosa (*Varacosa*): *Trochosa avara* Keyserling 1877, by original designation.

Trochosomma: *Trochosa amulipes* L. Koch 1875, by original designation.

Trochosa sepulchralis (Montgomery 1902)

Figs. 2, 3, 6–15

Lycosa sepulchralis Montgomery 1902:534, plate 29, fig. 7; Montgomery 1903:645, plate 29, fig. 1; Gertsch 1934:3.

Trochosa sepulchralis (Montgomery): Montgomery 1904:307.

Lycosa modesta Chamberlin 1908:568 (misidentification).

Lycosa acoma Chamberlin 1924:29; Gertsch & Wallace 1935:1, fig. 31; Wallace 1947:36. **New synonymy.**

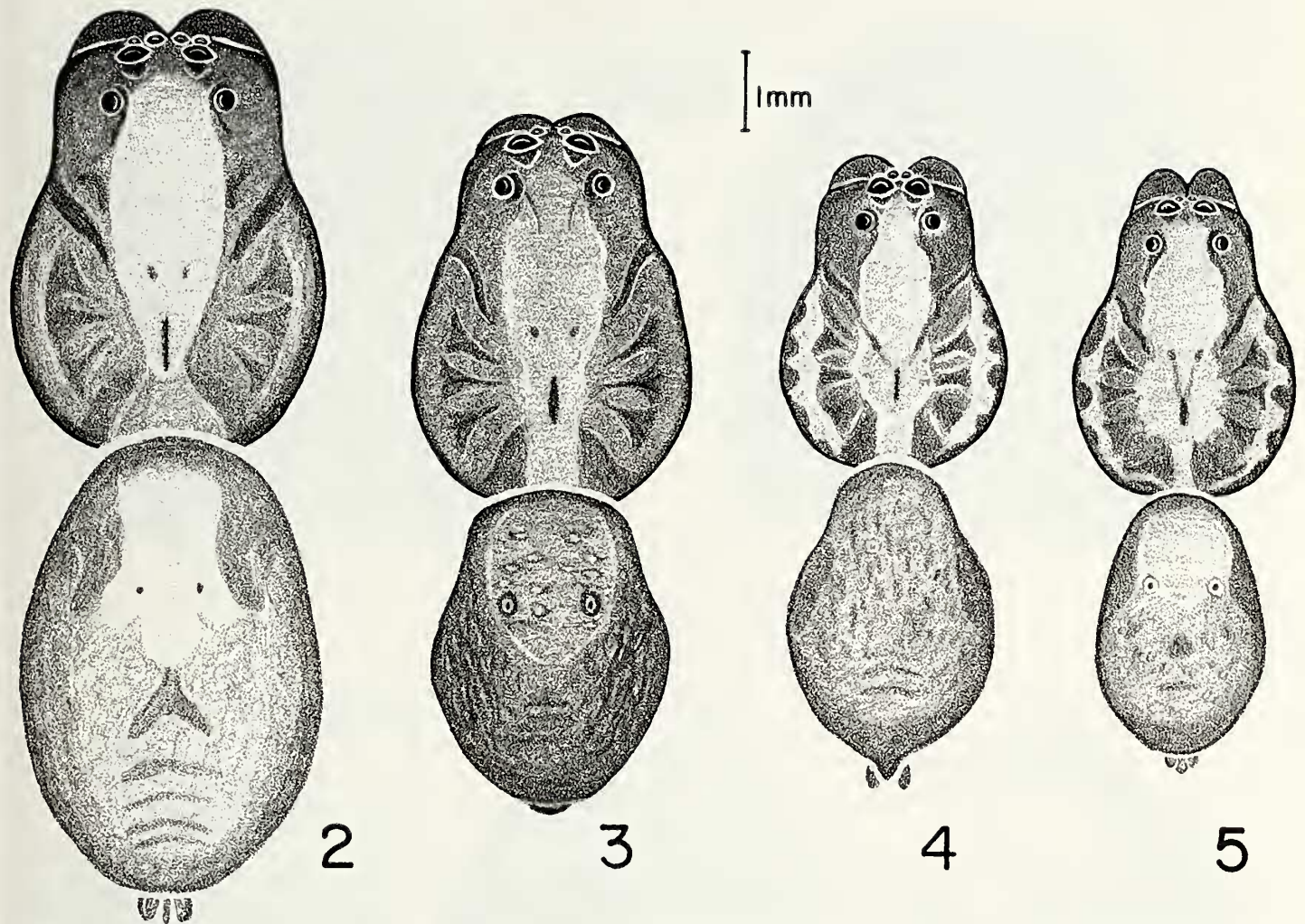
Varacosa acoma (Chamberlin): Roewer 1955:306; Breene et al. 1993:98, figs. 139A, B.

Geolycosa sepulchralis (Montgomery): Roewer 1955:245.

Material examined.—*Lycosa sepulchralis*: Holotype female, USA: *Pennsylvania*: Philadelphia County, Philadelphia, 39°57'N, 075°09'W, 1904, Montgomery (AMNH).

Lycosa acoma: Holotype female, USA: *Louisiana*: Orleans Parish: New Orleans, 29°57'N, 090°04'W, March 1924, H.E. Hubert (MCZ).

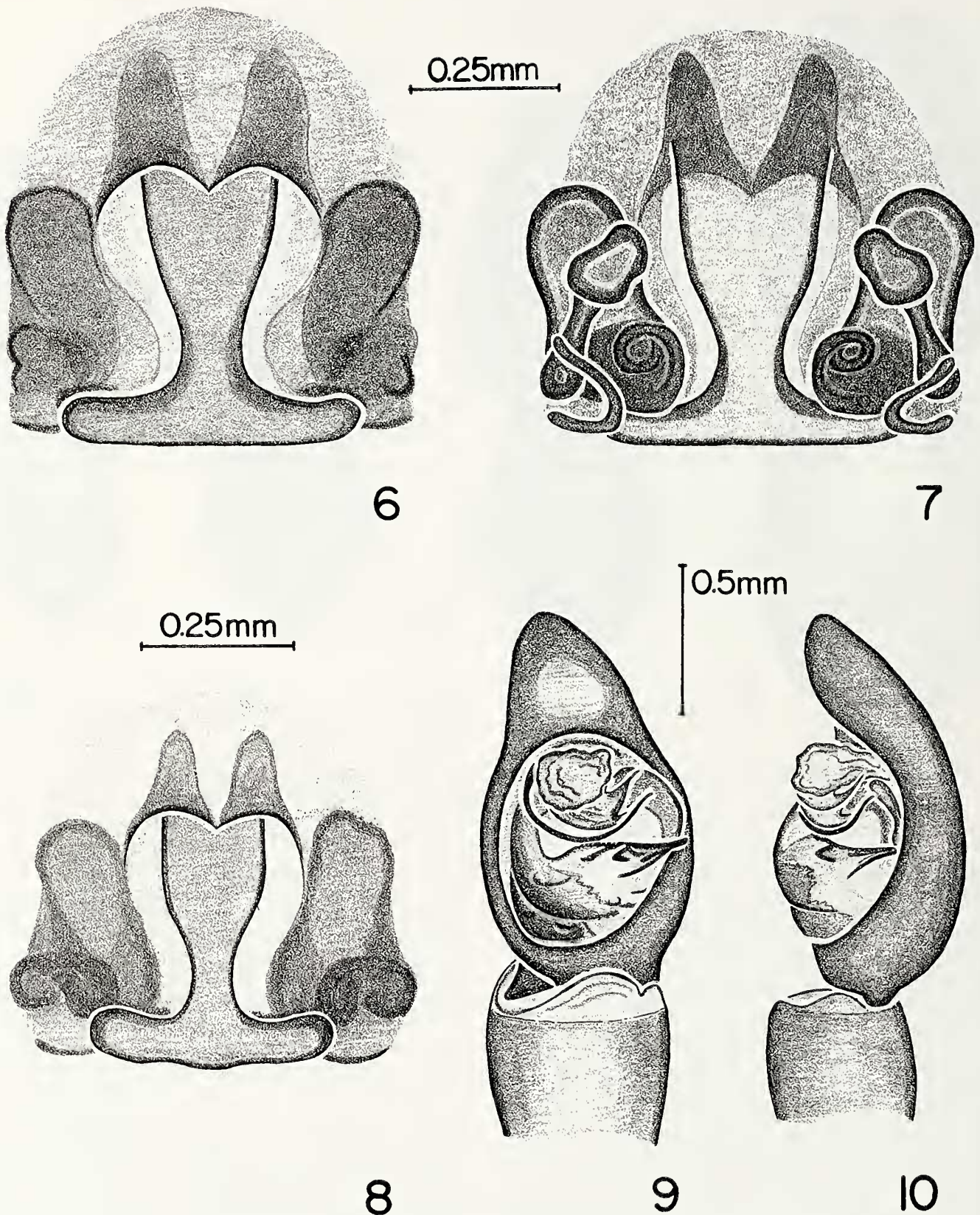
Other material examined: Localities from which specimens were measured indicated by *. USA: *Alabama*: 1 ♂, Macon County: 32°24'N, 085°49'W, 11 April 1954, H.K. Wallace (AMNH). *Arkansas*: 1 ♂, 1 ♀, Hempstead County: Hope, 33°40'N, 095°33'W, 1–19 June 1931, L. Knoble (AMNH)*; 2 ♀, Lawrence County: Imboden, 36°12'N, 091°10'W, B.C.



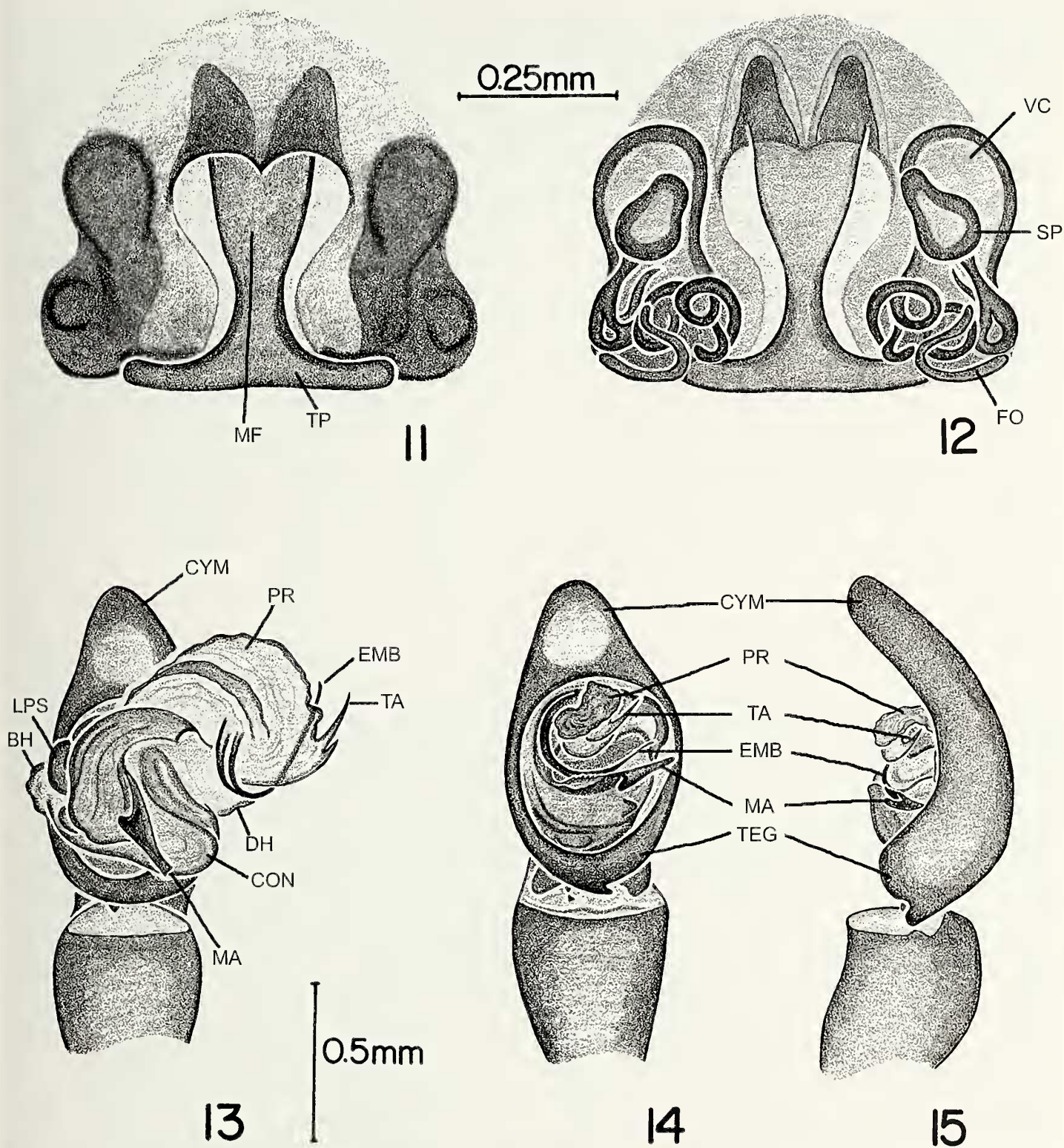
Figures 2-5.—Dorsal patterns of male and female *Trochosa sepulchralis* (Montgomery) and *Trochosa abdita* (Gertsch): 2. *T. sepulchralis* female from Pontotoc, Mississippi, 1962; 3. *T. sepulchralis* male from Livingston, Texas, 9 May 1952; 4. *T. abdita* female from Newnan's Lake, Gainesville, Florida, 13 June 1935; 5. *T. abdita* male from Sugarfoot Hammock, Gainesville, Florida, 19 March 1938.

Marshall (AMNH)*; 4 ♂, Logan County: Mt. Magazine Mossback Ridge, south slope, 35°10'N, 93°38'W, 16 June 1990 (AMNH); 1 ♀, same location, 20 June 1990 (AMNH); 2 ♂, same location, 23 June 1990 (AMNH). *Florida*: 2 ♀, Escambia County: Escambia, 30°40'N, 087°20'W, 6 July 1934, H.K. Wallace (AMNH); 1 ♂, 1 ♀, Liberty County: 30°25'N, 084°58'W, 10 March 1935, H.K. Wallace (AMNH); 4 ♂, 4 ♀, same location, 10 April 1935, H.K. Wallace (AMNH); 7 ♂, 5 ♀, Liberty County: Torreya Ravine, 30°34'N 084°56'W, 16 April 1938, W.J. Gertsch & W. Ivie (AMNH); 2 ♂, 3 ♀, 1 juvenile, Liberty County: Torreya State Park, 30°34'N 084°56'W, 13 May 1996, A.R. Brady (HCC). *Louisiana*: Grant Parish: Kisatchie, Port Grant, 31°27'N, 092°26'W, June 1941, Jones & Areher (AMNH); 1 ♀, Lincoln Parish: Ruston, 32°31'N, 092°38'W, 10 July 1950, M.A. Cazier (AMNH); 1 ♀, Orleans Parish: 29°57'N, 090°04'W, July 1954 (AMNH); 1 ♀, St. Landry Parish: Eunice, 30°29'N, 092°25'W, 31 August 1943, S. & D. Mulaik (AMNH). *Mississippi*: 1 ♀, Hinds County: Clinton, 32°20'N, 090°19'W, Spring 1926, Bailey (AMNH); 1 ♀, Jackson County: Ocean Springs, 30°24'N, 088°49'W, 19 June 1967, A. Moreton (AMNH); 2 ♀, Pontotoc County: Pontotoc, 34°14'N,

088°59'W, 1962, P. Dorris (AMNH)*; 1 ♀, Scott County: 5 km W. of Forest, 32°21'N, 089°28'W, 11 April 1963, W.J. Gertsch & W. Ivie (AMNH); 3 ♂, Washington County: Leland 101 Lysbeth St., 33°24'N, 090°53'W, 23-25 May 1983, T.C. Lockley, pitfall trap in mixed grasses (HCC); 3 ♂, 1 ♀, same location, 31 May-3 June 1983, T.C. Lockley, pitfall trap in mixed grasses (HCC); 1 ♂, 3 juveniles, same location, 5-8 June 1983, T.C. Lockley (HCC). *Missouri*: 1 ♂, Phelps County: Rolla, 37°57'N, 091°46'W, H. Frizzell (AMNH)*. *New York*: 1 ♂, Queens County: Flushing, 40°45'N, 073°49'W, 1938, K. Cooker (AMNH); 1 ♂, Suffolk County: Long Pond, 40°56'N 072°19'W, 29 June 1929, H.K. Wallace (AMNH). *North Carolina*: 1 ♂, Mecklenberg County: Davidson, 35°29'N, 080°50'W, 16 May 1954, E.E. Brown (AMNH). *Oklahoma*: 3 ♂, Comanche County: Wichita Mts. Wildlife Refuge, 34°43'N, 098°42'W, 18 April 1978, F. Bryce, pitfall (HCC); 3 ♂, same location, 5 May 1978, F. Bryce (HCC); 2 ♂, same location, 20 May 1978, F. Bryce (HCC); 2 ♂, same location, 15 April 1978, E.F. Bruce & T.C. Cokendolpher (HCC). *Pennsylvania*: 3 ♀, Philadelphia County: Woodlawn Cemetery, Philadelphia, 39°57'N, 075°09'W, 1 May 1910, T.H. Montgomery Jr. (AMNH). *Tennessee*: 1 ♀, Wilson



Figures 6-10.—Female and male genital structures of *Trochosa sepulchralis* (Montgomery): 6. Epigynum of *T. sepulchralis* holotype from Philadelphia, Pennsylvania; 7. Internal genitalia of same; 8. Epigynum of *T. acoma* (= *sepulchralis*) holotype from New Orleans, Louisiana; 9. Male palp, ventral view, of *T. sepulchralis* "type" from Philadelphia, Pennsylvania; 10. Retrolateral view of same.



Figures 11–15.—Female and male genitalic structures of *Trochosa sepulchralis*: 11. Epigynum of *T. sepulchralis* from Pontotoc, Mississippi, 1962; 12. Internal genitalia of same; 13. Expanded palp of male *T. sepulchralis* from Livingston, Texas, 9 May 1952; 14. Ventral view of same; 15. Retrolateral view of same.

County: Cedars of Lebanon, 36°05'N, 086°22'W, A.R. Brady (HCC). *Texas*: 1 ♀, Archer County, 33°35'N, 098°37'W, 20 March 1973, Zaltsberg (HCC); 1 ♀, Austin County: Bellville, 29°57'N, 096°15'W, 18 April 1941, O. Sanders (AMNH); 1 ♀, Austin County: State Park near Sealy, 29°48'N, 096°06'W, 19

April 1942, O. Sanders (AMNH); 1 ♀, Brown County, 31°42'N, 098°59'W, April 1983, K. Flatt (HCC); 1 ♀, Cameron County: Harlingen, 26°11'N, 097°41'W, 17 November 1934, S. Mulaik (AMNH); 2 ♀, 4 juvenile, same location, 18 November 1934, S. Mulaik (AMNH); 1 ♂, same location,

March 1936, L. Davis (AMNH); 1 ♀, Clay County, 33°49'N, 098°11'W, 18 August 1972, Zaltberg (HCC); 4 ♂, 2 ♀, Grayson County: Sherman, 33°38'N, 096°36'W, October 1964 K. W. Haller (AMNH)*; 1 ♀, same location, 15 September 1963, K.W. Haller (AMNH)*; 4 ♂, 4 ♀, same location, May 1965, K.W. Haller (AMNH)*; 7 ♂, 8 ♀, 6 juveniles, same location, May 1966, K.W. Haller (AMNH); 1 ♀, Harrison County: Caddo Lake State Park, 32°41'N, 094°10'W, 31 May 1940, S. & D. Mulaik (AMNH); 2 ♂, 1 juvenile, Hidalgo County: Edinburg, 26°18'N, 098°09'W, February 1934, S. Mulaik (AMNH); 2 ♀, same location, 27 October 1934, S. Mulaik (AMNH); 1 ♀, same location, 10–20 June 1935, S. Mulaik (AMNH); 1 ♀, same location, 15 October 1935, Schulle (AMNH); 1 ♂, same location, March 1936, S. Mulaik (AMNH); 1 ♂, same location, 25 March 1936, C. Rutherford (AMNH); 2 ♂, same location, 3 May 1937, S. Mulaik (AMNH); 11 ♂, 1 ♀, same location, September 1934, S. Mulaik (AMNH); 3 ♀, same location, 31 August 1946, S. & D. Mulaik (AMNH); 1 ♀, Hidalgo County: San Juan, 26°11'N, 098°09'W, 22 February 1935, S. Mulaik (AMNH); 1 ♀, Jasper County: Jasper, 30°55'N, 093°59'W, 6 June 1936, S. Mulaik (AMNH); 1 ♀, Kerr County: Raven Ranch, 30°02'N, 099°08'W, June 1941, S. & D. Mulaik (AMNH); 1 ♀, Kimble County, 30°29'N, 099°46'W, 15 April 1972, N.V. Horner (HCC); 1 ♀, Polk County: Livingston, 30°42'N, 094°54'W, 21 August 1940, S. & D. Mulaik (AMNH); 8 ♂, 8 ♀, same location, 9 May 1952, M. Cazier, W.J. Gertsch, R. Schrammel (AMNH)*; 1 ♀, McLennan County: Camp Tonkawa Crawford, 31°32'N, 97°26'W, 18 April 1943, O. Sanders (AMNH); 1 ♀, Panola County: Carthage, 32°09'N, 094°20'W, 9 May 1952, M. Cazier, W.J. Gertsch, R. Schrammel (AMNH); 1 ♀, San Jacinto County: Oakhurst, 30°44'N, 095°18'W, 10 May 1952, M. Cazier, W.J. Gertsch, R. Schrammel (AMNH); 18 ♂, San Patricio County: 13 km. N.E. of Sinton, 28°02'N, 097°30'W, 22 March 1960, H.E. Laughlin (AMNH); 4 ♂, same location, 28 April 1960, H.E. Laughlin (AMNH); 1 ♂, 4 ♀, same location, 12 May 1960, H.E. Laughlin (AMNH); 1 ♀, same location, 26 May 1960, H.E. Laughlin (AMNH); 1 ♀, same location, 4 August 1960, H.E. Laughlin (AMNH); 2 ♀, 1 juvenile, same location, 4 August 1960, H.E. Laughlin (AMNH); 1 ♀, Taylor County: Abilene, 32°26'N, 099°43'W, Summer 1943, M.M. Willis (AMNH); 2 ♀, same location, July 1962, K.W. Haller (AMNH); 1 ♀, Terrell County: Dryden, 30°02'N, 102°06'W, 27 March 1946, C.D. Michener (AMNH); 1 ♀, Tom Green County: Water Valley, 31°40'N, 100°43'W, December 1939, D. & S. Mulaik (AMNH); 1 ♂, Travis County: Austin, 30°16'N, 097°44'W, December 1944, H. Exline (AMNH); 1 ♂, same location, 29 April 1946, H.E. & D.L. Frizzell (AMNH); 2 ♀, same location, 4 May 1947, H. Exline (AMNH); 1 ♀, Travis County: Upper Bull Creek, 30°16'N, 097°44'W, 17 March 1946, D.L. & H.E. Frizzell (AMNH); 1 ♀, Val Verde County: 3 km W. of Langtry, 29°48'N, 101°33'W, 22 October 1972, Parrish (HCC); 1 ♀, Wichita County, 33°54'N, 098°29'W, 6 April 1967, Mark Wilson (HCC); 1 ♀, same location, 18 April 1967, M.V. Eustice (HCC); 1 ♀, same location, 5 November 1967, M.V. Eustice (HCC); 1 ♂, same location, 10 February 1973, L. Pierce (HCC); 1 ♀, same location, 10 March 1973, Busboom (HCC); 1 ♀, same location, 12 March 1973, Busboom (HCC); 2 ♀, same location, 14 April 1973, R. Snider

(HCC); 1 ♀, same location, 25 October 1974, R. Wallenshis (HCC); 1 ♀, same location, 14 February 1975, R. Roberts (HCC); 1 ♀, same location, 3 April 1975, R. Roberts (HCC); 1 ♂, 1 ♀, same location, 20 April 1975, R. Galloway (HCC); 1 ♀, same location, 20 April 1975, M. Triddy (HCC); 1 ♀, same location, 20 April 1975, K. Zinn porch (HCC); 1 ♀, same location, 28 April 1977, F.D. (HCC); 1 ♂, same location, 2 April 1978, N.D. Hodson (HCC); 1 ♀, same location, 17 April 1981, Schultz (HCC); 1 ♀, same location, 27 April 1983, L. Presley (HCC); 1 ♀, same location, 1 May 1983, B. Wilkins (HCC); 1 ♂, same location, 4 May 1983, B. Wilkins (HCC).

Etymology.—The specific name was derived from the word *sepulcher*, a burial vault, and is likely a reflection upon the location from which it was first described: Philadelphia's Woodlands Cemetery, where many of Montgomery's specimens of this species were collected.

Diagnosis.—Males of *Trochosa sepulchralis* are distinguished from other Nearctic *Trochosa* by the secondary projection on the terminal apophysis, the lack of a spiraled embolus, and lack of fang excrescence. The female of *T. sepulchralis* can be separated by the lack of dash marks in the median stripe (Figs. 2, 3), b:a genitalic ratio of 4.1–7.2, and d:z ratio from 0.52–0.61 (Table 2). Both sexes are also large (6.2–13 mm), have a dark venter, and in alcohol bear inconspicuous annulations on the legs.

Description.—*Male*: Chelicerae: dark brown; often with three teeth on the anterior and posterior margins; some specimens have four teeth on posterior margin; central anterior tooth is largest; all posterior teeth of equal length. Carapace (Fig. 3): golden brown background, dark markings; median light stripe extending from within POQ to rear of carapace; stripe not highly contrasted to the background color; widest immediately posterior to the PLE, thinning behind fovea; symmetric series of five thin bands or rays extending on each side from median stripe to submarginal area. Eyes of PER encircled with black. Dorsum of abdomen: light over heart region, otherwise mottled brown, uniformly dark, or rarely provided with a dark heart mark and indistinct chevrons. Legs: indistinctly annulate; longest to shortest IV: I: II: III. Endites and labium: dark as sternum; light anterior margins. Sternum: dusky. Venter: solidly dark brown or black. Unexpanded palpus (Figs. 9, 10, 14, 15): curved embolus, origin within prolateral margin of palea; embolus may or may not curve below the upper portion of tegulum and median apophysis; tip of embolus ends within broad conductor; terminal apophysis accompanied by very small or tiny secondary projection, both structures protruding from lower portion of palea; margin where median apophysis and tegulum join often faintly serrated; lunar plate of the subtegulum at base of tegulum. Expanded palpus (Fig. 13): very prominent palea region projecting beyond the cymbium; lunar plate of the subtegulum conspicuous, overlaps portion of basal haematodocha; linear portions of embolus and terminal apophysis near their tips are not perpendicular to the median apophysis, but rather angled.

Female: Very similar to male. Chelicerae: dark brown; three teeth on anterior and posterior margins. Carapace (Fig. 2): wide median light stripe extending from middle of POQ to posterior margin of the carapace, stripe varies in intensity, not always distinct; dark radiating lines extend distally from edges

Table 1.—Measurements (mm) of *Trochosa sepulchralis* (Montgomery) and *T. abdita* (Gertsch).

Dimension	<i>Trochosa sepulchralis</i> ♂ n = 10		<i>Trochosa abdita</i> ♂ n = 10		<i>Trochosa sepulchralis</i> ♀ n = 10		<i>Trochosa abdita</i> ♀ n = 9	
	Mean ± SD	Max.–Min.	Mean ± SD	Max.–Min.	Mean ± SD	Max.–Min.	Mean ± SD	Max.–Min.
Clypeus Height	0.14 ± 0.03	0.18–0.08	0.10 ± 0.03	0.15–0.07	0.18 ± 0.02	0.22–0.17	0.15 ± 0.03	0.22–0.12
AER Width	0.78 ± 0.08	0.85–0.67	0.61 ± 0.05	0.68–0.52	0.86 ± 0.07	0.96–0.73	0.62 ± 0.19	0.76–0.13
PMEW	0.94 ± 0.09	1.0–0.8	0.73 ± 0.05	0.83–0.68	1.0 ± 0.1	1.1–0.9	0.78 ± 0.07	0.88–0.70
PLEW	1.2 ± 0.1	1.3–1.0	0.92 ± 0.06	1.0–0.8	1.3 ± 0.1	1.4–1.2	1.0 ± 0.1	1.2–0.8
POQ Length	0.84 ± 0.08	0.93–0.71	0.67 ± 0.04	0.75–0.61	0.91 ± 0.07	1.0–0.8	0.70 ± 0.06	0.76–0.61
Carapace Width	3.4 ± 0.4	3.8–2.7	2.5 ± 0.2	2.8–2.2	3.6 ± 0.4	4.1–3.0	2.6 ± 0.4	3.2–2.2
CWPLE	1.9 ± 0.2	2.1–1.5	1.4 ± 0.1	1.7–1.3	2.4 ± 0.2	2.8–2.0	1.7 ± 0.2	2.0–1.5
Carapace Length	4.5 ± 0.5	5.1–3.6	3.4 ± 0.3	3.9–3.0	5.0 ± 0.4	5.5–4.2	3.7 ± 0.5	4.4–3.0
Total Length	8.2 ± 0.3	9.3–6.2	6.2 ± 0.6	7.2–5.5	11.0 ± 2.0	13.0–8.0	7.5 ± 1.4	9.0–5.6
Ant. CT	3.0 ± 0.0	3.0–3.0	3.0 ± 0.0	3.0–3.0	3.0 ± 0.0	3.0–3.0	3.0 ± 0.0	3.0–3.0
Post. CT	3.1 ± 0.3	3.5–2.5	3.1 ± 0.3	4.0–3.0	3.0 ± 0.0	3.0–3.0	2.9 ± 0.2	3.0–2.5
Labium Length	0.53 ± 0.05	0.58–0.43	0.40 ± 0.03	0.45–0.37	0.66 ± 0.08	0.80–0.52	0.45 ± 0.07	0.52–0.33
Labium Width	0.56 ± 0.06	0.63–0.43	0.41 ± 0.05	0.50–0.37	0.70 ± 0.06	0.80–0.60	0.49 ± 0.05	0.53–0.42
Femur I	3.1 ± 0.2	3.3–2.6	2.1 ± 0.2	2.6–1.1	3.0 ± 0.3	3.4–2.5	2.2 ± 0.3	2.6–1.85
PT I	4.0 ± 0.3	4.3–3.4	2.6 ± 0.5	3.3–1.3	3.9 ± 0.3	4.5–3.4	2.8 ± 0.5	3.4–2.0
Metatarsus I	2.4 ± 0.2	2.6–2.0	1.4 ± 0.2	1.5–0.7	1.8 ± 0.2	2.1–1.5	1.2 ± 0.2	1.5–0.9
Tarsus I	1.4 ± 0.07	1.5–1.3	0.98 ± 0.16	1.1–0.6	1.2 ± 0.1	1.3–1.0	0.93 ± 0.12	1.1–0.8
Total leg I	11.0 ± 1.0	12.0–9.0	7.1 ± 1.3	8.5–3.7	9.9 ± 0.9	11.0–8.0	7.1 ± 1.0	8.6–5.8
PT II	3.5 ± 0.2	3.8–3.1	2.4 ± 0.5	3.0–1.0	3.4 ± 0.3	4.0–2.9	2.5 ± 0.4	3.1–2.0
PT III	2.9 ± 0.2	3.2–2.6	2.0 ± 0.4	2.4–1.0	3.0 ± 0.3	3.3–2.8	2.2 ± 0.3	2.6–1.8
Femur IV	3.3 ± 0.2	3.5–3.0	2.4 ± 0.4	2.8–1.3	3.4 ± 0.3	4.0–2.8	2.5 ± 0.3	3.0–2.1
PT IV	4.1 ± 0.1	4.3–3.8	2.9 ± 0.6	3.6–1.4	4.2 ± 0.1	4.6–3.7	3.1 ± 0.3	3.6–2.6
Metatarsus IV	3.4 ± 0.2	3.7–3.2	2.5 ± 0.4	3.0–1.3	3.3 ± 0.9	3.6–3.0	2.4 ± 0.3	2.8–2.0
Tarsus IV	1.5 ± 0.1	1.7–1.3	1.2 ± 0.2	1.4–0.7	1.4 ± 0.1	1.7–1.3	1.2 ± 0.1	1.4–1.1
Total leg IV	12.0 ± 1.0	13.0–11.0	8.9 ± 1.6	11.0–5.0	12.0 ± 1.0	14.0–11.0	9.2 ± 1.0	11.0–8.0
Palpal								
Macrosetae	20.0 ± 6.0	30.0–14.0	7.1 ± 2.1	11.0–4.0				

of the median stripe to submargin of carapace; eyes of PER encircled by black. Dorsum of abdomen: light over heart, otherwise uniformly dusky or darkly mottled; rarely marked with chevrons; apodemes often conspicuous. Legs: indistinctly annulate; longest to shortest IV: I: II: III. Venter: uniformly dark or dusky. Endites and labium: dark as sternum; light anterior margins. Sternum: dark; almost always marked with inconspicuous light stripe near anterior margin. Epigynum (Figs. 6, 8, 11): inverted “T;” large, highly visible vulval

chambers on either side of copulatory openings equal in height to middle field, directly visible as darkened regions through the integument; middle field widened anteriorly, most narrow portion approximately two-thirds of its maximum width; transverse piece thin, only slightly upturned at ends; vulval chambers large and rounded, extending beyond slender middle field; internal structures also bulge laterally above darkened fertilization ducts; epigynum nearly as wide as long. Internal genitalia (Figs. 7, 12): high level of complexity; spermathecae

Table 2.—Measurements (mm) of epigyna of *Trochosa sepulchralis* and *T. abdita*.

Dimension	<i>Trochosa sepulchralis</i> ♀ n = 10		<i>Trochosa abdita</i> ♀ n = 9	
	Mean ± SD	Max.–Min.	Mean ± SD	Max.–Min.
a	0.09 ± 0.02	0.13–0.07	0.07 ± 0.01	0.09–0.05
b	0.47 ± 0.06	0.54–0.35	0.32 ± 0.04	0.37–0.28
c	0.39 ± 0.03	0.47–0.30	0.30 ± 0.02	0.34–0.26
d	0.38 ± 0.03	0.46–0.30	0.19 ± 0.03	0.24–0.13
e	0.17 ± 0.03	0.26–0.13	0.18 ± 0.03	0.23–0.15
X	0.69 ± 0.05	0.77–0.59	0.53 ± 0.06	0.61–0.43
Y	0.22 ± 0.04	0.32–0.18	0.16 ± 0.03	0.20–0.13
Z	0.68 ± 0.05	0.78–0.58	0.52 ± 0.04	0.60–0.47
Ratio d:z (mean)	0.56		0.37	
Ratio d:z (max.–min.)	0.61–0.52		0.47–0.28	
Ratio a:e (mean)	0.56		0.39	
Ratio a:e (max.–min.)	0.75–0.36		0.48–0.33	
Ratio b:e (mean)	2.9		1.9	
Ratio b:e (max.–min.)	3.6–2.0		2.4–1.4	
Ratio d:c (mean)	0.99		0.63	
Ratio d:c (max.–min.)	1.2–0.89		0.80–0.47	

superimposed over large vulval chambers, bent towards the copulatory openings, heads oblong with most narrow portion directed anteriorly; complicated mass of ducts along base of spermathecae, dorsal or ventral to fertilization ducts.

Measurements.—Ten males and ten females were measured (Tables 1, 2). Somatic features are presented in Table 1. Measurements and dimension ratios of female epigyna are in Table 2.

Distribution and habitat preferences.—*Trochosa sepulchralis* occurs throughout the central southern region of the United States. It is found from Florida in the east to Texas in the west, and north to New York (Figure 21). The habitat preference of this species is similar to other species of *Trochosa*. It prefers the edge of woods where it is often collected by hand or through the use of pitfall traps.

Trochosa abdita (Gertsch 1934)

Figs. 4, 5, 16–20

Lycosa abdita Gertsch 1934:3; Wallace 1947:36 (synonymized with *Trochosa acoma*, overlooked by subsequent workers).

Trochosa abdita (Gertsch): Barnes 1953:13.

Geolycosa abdita (Gertsch): Roewer 1955:243.

Material examined.—Holotype female: USA: Florida: Alachua County, Gainesville, "3608," 29°39'N, 082°19'W (AMNH).

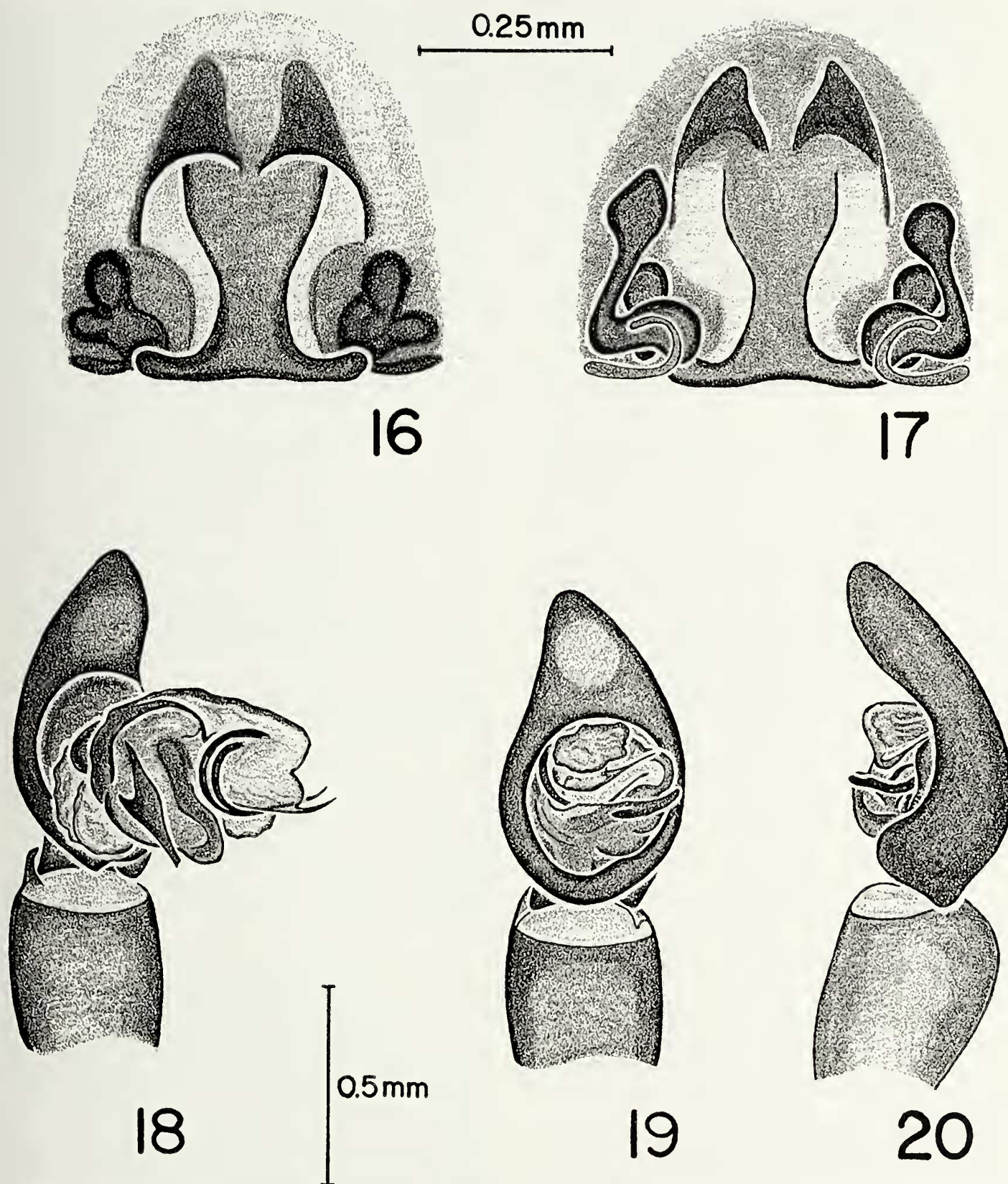
Other material examined.—Specimens measured are indicated by *. USA: Florida: 1 ♀, Alachua County: Newnan's Lake, 29°39'N, 082°19'W, 13 June 1935, W. Ivie (AMNH)*; 1 ♂, same location, 19 March 1938, W.J. Gertsch (AMNH)*; 1 ♂, same location, 15 May 1926, Hubbell (AMNH); 1 ♂, Alachua County: Sugarfoot Hammock near Gainesville, 29°39'N, 082°19'W, 19 March 1938, W.J. Gertsch (AMNH)*; 1 ♀, 2 ♂, same location, 19 March 1938, W.J. Gertsch (AMNH)*; 1 ♂, Alachua County, 29°39'N, 082°19'W, 14 March 1934, H.K. Wallace (AMNH); 5 ♂, 3 ♀, 1 juvenile, Alachua County: Newnan's Lake, Gainesville, 29°39'N, 082°19'W, 28 March 1957, Gertsch & Forster (AMNH); 1 ♂, Calhoun County: Blountstown, 30°26'N, 085°02'W, 17 April 1938, Gertsch (AMNH)*; 1 ♂, Highlands County: Archbold Biological Station, 27°17'N, 081°21'W, 19 December 1962, W. Ivie (AMNH)*; 2, same location, 19 December 1962, W. Ivie (AMNH)*; 1 ♂, Highlands County: Highlands Hammock near Sebring, 27°29'N, 081°26'W, 14 March 1938, W.J. Gertsch (AMNH)*; 1 ♂, same location, 24 March 1938, W.J. Gertsch (AMNH)*; 1 ♀, Highlands County: Sebring, 27°29'N, 081°26'W, 7 March 1939, F.E. Lutz (AMNH)*; 1 ♂, Miami-Dade County: Homestead, 25°28'N, 080°28'W, 30 January 1959, R.E. Woodruff (AMNH)*; 1 ♂, Miami-Dade County: Miami, 25°43'N, 080°14'W, 1 February 1967 (AMNH); 1 ♀, Okeechobee County: Okeechobee, 27°14'N, 080°49'W, 26 March 1938, W.J. Gertsch (AMNH)*; 1 ♂, same location, 28 March 1938, W.J. Gertsch (AMNH)*; 1 ♂, Martin County: Port Mayaca, Lake Okeechobee, 26°59'N, 080°36'W, 29 March 1938, W.J. Gertsch (AMNH)*; 1 ♂, Monroe County: Key West, 24°33'N, 081°47'W, 5 February 1967 (AMNH); 1 ♀, Putnam County: Welaka Reserve, 29°28'N, 081°40'W, 5 May 1973, A.R. Brady, pine litter (HCC)*; 1 ♀, Sarasota County: Lido Key, 27°20'N, 082°31'W, 28 March 1943, B. Malkin (AMNH)*; 1 ♂, Seminole County: Sanford, 28°48'N, 081°16'W, 30 March 1942, W.H.&L.F. Stickel (AMNH); 2 ♂

♀, Taylor County: Stephensville, 29°40'N, 083°23'W, 26 March 1933, H.K. Wallace (AMNH); 1 ♂, 1 ♀, Volusia County: Benson Spring, 28°51'N, 081°19'W, 11 November 1933, H.K. Wallace (AMNH)*; 1 ♀, Volusia County: Deland, 29°01'N, 081°18'W, 25 March 1939, F.E. Lutz (AMNH)*. 1 ♀, North Carolina: 1 ♀, Carteret County: Carrot Island, Beaufort, 34°43'N, 076°39'W, 15 July 1951, R.D. Barnes (AMNH)*; 1 ♀, same location, 8 August 1951, R.D. Barnes (AMNH).

Etymology.—The specific name is Latin, and means hidden or obscure.

Diagnosis.—Males of *Trochosa abdita* can be distinguished from other Nearctic *Trochosa* by the lack of a secondary projection on the terminal apophysis of the palpus, no spiraling of the embolus, and lack of fang excrescence. Likewise females do not have darkened dash marks (Figs. 4, 5) within the median light stripe, and an epigynum with b:a ratio of 4.0–5.75 and d:z ratio 0.28–0.47 (Table 2). Both sexes of this spider are small (5.5–9.0 mm) with a light or spotted venter, strong annulations on all leg segments, and a distribution almost entirely limited to peninsular Florida (Fig. 21).

Description.—*Male*: Chelicerae: darkened, most often same color as carapace; usually armed with three teeth on both anterior and posterior margins; occasionally with four posterior teeth. Central anterior tooth is largest; all posterior teeth of equal size. Carapace (Fig. 5): golden brown background, markings in dark brown; light median area running from immediately posterior the PMER to the most posterior margin of the carapace, wider behind the PMER, tapering at the posterior declivity; series of narrow or thin bands radiating outward which extend from the fovea, beginning outside of the median light stripe and terminating at submarginal light stripes. Submarginal stripes undulate between the ends of the radiating bands and dark markings proximal to margin of carapace; eyes of AME and PER encompassed by very dark nacelles. Dorsum of abdomen: nearly uniform background mottled dark; faint traces of chevrons; two spotted apodemes. Legs: annulate or banded, especially femora; unambiguous and visible without magnification; longest to shortest IV: I: II: III. Endites: somewhat lighter than the labium; curved slightly inward. Labium: square or slightly wider than long; dark posteriorly and at the margins. Sternum: typically light, taking on dusky quality in some specimens. Venter: mottled with dark spots; usually more heavily so around margins; central region may be light, or have a dusky tinge. Unexpanded palpus (Figs. 19, 20): spiraled embolus curving from behind the palea, dips below the tegulum briefly and terminates within the cup of the conductor; terminal apophysis arising from below palea and extending over upper portion of the conductor; distal margin of area where the tegulum joins median apophysis often marked by very subtle serration; median apophysis dark, protruding slightly over cymbium, as does conductor; lip or margin of conductor slightly swollen, producing a concavity; tip of palpus never armed with more than twelve robust macrosetae, though these may be accompanied by a number of longer hairs and/or setae of weaker constitution. Expanded palpus (Fig. 18): palea swollen; embolus and ejaculatory duct extended, join together immediately before terminal apophysis which projects over and across them; lunar plate of subtegulum below the tegulum and above the basal haematodocha; distal haematodocha



Figures 16-20.—Female and male genitalic structures of *Trochosa abdita* (Gertsch): 16. Epigynum of *T. abdita* from Newnan's Lake, Gainesville, Florida, 13 June, 1935; 17. Internal genitalia of same; 18. Expanded palp of male *T. abdita* from Sugarfoot Hammock, Gainesville, Florida, 19 March 1938; 19. Ventral view of same; 20. Retrolateral view of same.

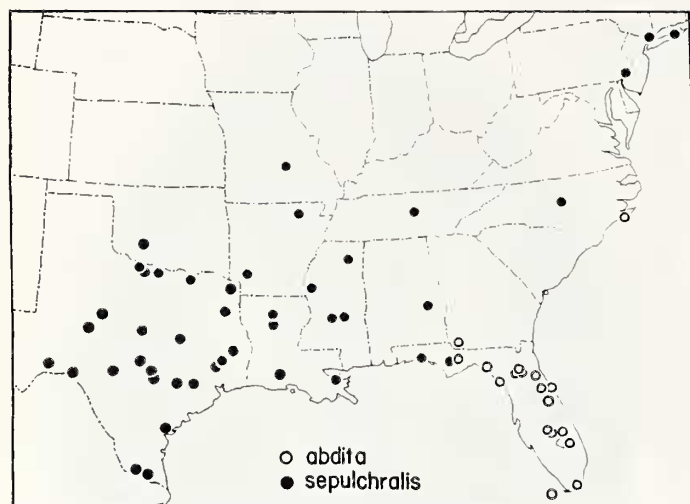


Figure 21.—Distribution map of *Trochosa abdita* and *T. sepulchralis*.

partly visible beneath embolus and terminal apophysis relative to the position of the median apophysis. The embolus and terminal apophysis project themselves nearly perpendicular to the median apophysis.

Female: Very similar to male. Chelicerae: dusky to dark; three teeth on both margins; posterior margins may be armed with only a pair of teeth; teeth sizes follow that of the male. Carapace (Fig. 4): golden; marked by median light stripe of varying width, extending from PME to rear of the carapace; dark bands or rays extend towards undulating submarginal light stripes where they terminate. Margins of carapace marked by numerous dark projections; eyes encircled by a dark color. Dorsum of abdomen: uniformly mottled; heart mark may be visible anteriorly and faint chevrons may be seen posteriorly. Legs: moderately to strongly annulate; longest to shortest IV: I: II: III. Endites, labium, and sternum: light; labium often darker near posterior margin. Venter: mottled with dark spots on a light background. Epigynum (Fig. 16): inverted "T;" middle field widened anteriorly; narrowest portion of middle field about half as wide as widest point; transverse piece thin, slightly directed anteriorly at both ends. Portions of internal genitalic structures visible through integument; rounded structures extend anteriorly to about two-thirds the height of middle field; project anteriorly and laterally, beneath lie two darkened areas marking fertilization ducts; epigynum nearly as long as wide. Internal genitalia (Fig. 17): with spermathecae appearing as bent arms with "elbows" projecting laterally; top of spermathecae rounded, appearing as a smooth circle atop a stalk; behind spermathecae lie vulval chambers extending vertically with widened top; fertilization ducts curl ventrally toward the midline.

Measurements.—Ten males and nine females were measured (Tables 1, 2). Somatic features are presented in Table 1. Measurements and dimension ratios of female epigyna are in Table 2.

Distribution and habitat preferences.—*Trochosa abdita* is found from southern Florida northwestward to the Florida panhandle and north to the coastal region of North Carolina (Fig. 21). In western Florida, it can be confused with a very similar looking species to which it is clearly related. This

discrepancy is addressed in the discussion section. In Wallace's synonymy (1947), he reports that *T. abdita* "is one of the characteristic species of the leaf mould of mesophytic hammocks in north-central Florida; it seems to favor moist situations in these hammocks." He goes on to associate *T. abdita* with wet hammocks and swamps. Wallace also states that "It is usually found close to its retreat which is most often a shallow burrow in the ground beneath the leaf mould; sometimes it is found under or in rotten logs."

DISCUSSION

The two species treated in this manuscript are similar in morphology, but are clearly distinct from one another. *Trochosa abdita* is known from the Florida peninsula and along the southern Atlantic coast while *T. sepulchralis* (under the name *T. acoma*) is most often documented from Texas and the surrounding states (Fig. 21). *Trochosa sepulchralis* is nearly 30% larger than *T. abdita* in almost every regard (Table 1). The female epigynum differs between the two species with *T. abdita* having internal structures that are truncated and simple, while in *T. sepulchralis* they are large and complex (compare Figs. 7, 12 with Fig. 17). These differences are visible even through the integument of the venter (compare Figs. 6, 8, 11 with Fig. 16), and may also be noted quantitatively through the measurement of the epigynum as explained in the methods and Fig. 1, finally comparing the values to those from Table 2. The carapace pattern of *T. abdita* is more elaborate, with a more pronounced median light stripe, and wavy submarginal light stripes. The legs of *T. abdita* are more strongly and much more often annulate, while its light venter is contrasted with the dark venter of *T. sepulchralis*.

As previously noted, the areas in and around Liberty County, Florida are known to produce spiders with morphological characters such as color pattern similar to those of *T. abdita*, but having genitalic characters like those of *T. sepulchralis*. Currently it is unknown if these specimens represent hybrids where the distribution of these two species overlaps, or if these populations represent a third species. Conventional wisdom dictates that genitalic characters supercede somatic characters, and for this reason the authors advocate recognition of these specimens as *Trochosa sepulchralis* until their relationship to other populations is more fully understood.

ACKNOWLEDGMENTS

Thanks are warmly extended to Norman Platnick (AMNH) and Laura Liebensperger (MCZ) for the loan of specimens critical to the completion of this study. Louis Sorkin is recognized for his hospitality while visiting the AMNH, help in procuring relevant manuscripts, and providing the palpal expansion protocol. The assistance of Thomas Bultman is recognized for reviewing an early version of the manuscript, as well as for his personal support for this project. We also gratefully acknowledge the resources provided by Hope College to us during the course of this research.

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Manuscript received 13 April 2007, revised 12 September 2007.